**STATE REVOLVING FUND (SRF) LOAN PROGRAMS**

**SUSTAINABLE INFRUSTUCTURE/GREEN INITIATIVES (SI/GI) INCENTIVE**

**RESOURCE DOCUMENT**

The following list is provided as a resource for SRF Loan Programs participants and consultants. The SRF Loan Programs may update this list from time to time as components and technologies other than those listed below are introduced. Participants are encouraged to introduce additional sustainable infrastructure/green technologies for the SRF Loan Programs to consider. The SRF Loan Programs do not encourage, endorse or prescribe a method of construction, system design, technology or equipment. It is the participant's responsibility to obtain the necessary approvals and permits and properly design, build and effectively operate and maintain the proposed facilities covered in the Preliminary Engineering Report (PER). The SI/GI interest rate discount for each project will be determined by SRF Loan Programs at the SRF loan closing. For requirements and additional information regarding the 0.5% maximum SI/GI interest rate discount please contact the SRF Loan Programs.

# SI/GI CATEGORIES

## 1. Energy Reduction/Alternative Source

### 1.1. <u>Design that reduces the carbon footprint</u>

A carbon footprint is typically divided into two parts:

a) A primary carbon footprint results from direct combustion of fuel. A facility's primary carbon footprint may be reduced through the use of alternative/renewable energy. Examples of alternative/renewable energy include: solar, wind, geothermal, biomass and biogas. The primary carbon footprint reduction goal may be met when:

- The onsite renewable energy sources generate at least 10% of the facility's total energy use; or
- At least 10% of the facility's total energy is purchased as renewable power through a utility provider.

b) A secondary carbon footprint results from indirect release of carbon emissions. A facility's secondary carbon footprint may be reduced through the use of local materials. An example of secondary carbon foot print include: purchasing materials like steel, concrete, and lumber that are extracted and manufactured in Indiana. The secondary carbon footprint reduction goal may be met when:

- A project uses a percentage of materials (by cost) which are extracted and manufactured locally; or
- A Percentage of materials originate within 300 miles of the project site.

### 1.2. <u>Facility site planning includes sustainable building components</u>

A facility can maximize energy efficiency by designing:

- Buildings have south-facing windows to provide good daylight and optimize solar gain;
- Roofs and hardscape (e.g. road, sidewalk and parking) are shaded or made with materials that have a high solar reflectance (i.e. white or gray in color) to reduce heat island effects; for example, trees are planted that will shade 50% of roofs and hardscape within 10 years of project completion.

### 1.3. Design includes an energy reduction plan with at least a 20% reduction goal

The U.S. EPA estimates that wastewater and drinking water utility energy consumption can account for 30-60% of a city's energy bill[1]. A utility can save energy and money by implementing an energy management plan. An effective energy management plan may include:

- Create a system to track energy usage and costs;
- Upgrade equipment, systems, and controls including facility and collection system improvements to increase efficiency; for example, variable frequency drives, fine bubble diffusers, high-efficiency motors, high-efficiency HVAC;
- Develop a cost effective energy supply purchasing system; for example, working with an energy utility to purchase energy at a reduced cost during low-demand periods;
- Optimize load profiles by shifting operations where possible;
- Develop in-house energy management training for operators.

The PER should address the following:

- Plan/Design for 20%+ energy reduction goal, based on an energy audit;
- Identify the results of the energy audit and energy saving recommendations;
- The energy reduction plan should give priority to addressing the least energy efficient components first, before investing in new components.

### 1.4. Project uses a SCADA (Supervisory Control and Data Acquisition) system to reduce energy consumption and enhance process control

When a SCADA system performs data collection and control at the supervisory level and is used in conjunction with a real-time control system to control processes external to the SCADA system, energy savings can be realized.

### 1.5. Fifty percent of the construction work uses clean fuel construction vehicles

Construction activity can negatively impact air quality. By reducing vehicle emission or retrofitting construction equipment with pollution controls, air quality can be improved. Examples of construction activity that will improve air quality include:

Diesel emission traps

- Vehicles that burn clean fuel and the installation of exhaust control on construction vehicles (e.g. ultra low sulfur diesel),
- Reduced idle time

## 2. Wetland, Water Reuse and Reduction Items

### 2.1. The project creates, restores or expands a wetland

Wetlands improve water quality, alleviate flooding, recharge groundwater and reduce greenhouse gases via natural processes. Improving the quality of surface and ground water may reduce the cost of treatment for drinking water utilities. Communities may realize these benefits by creating, restoring, or expanding wetlands*** and restoring stream banks.

[1] *Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities*, January 2008, U.S. Environmental Protection Agency

The PER should describe the type and size (acreage/linear feet) of wetland/stream bank project. Before awarding any credit, the SRF Loan Programs will coordinate a review of the proposed project with the Indiana Department of Environmental Management Office of Water Quality Wetlands and Storm Water Section.

***Federal rules prevent the SRF Loan Programs from providing financing assistance for a wetland required as a mitigation measure.*

**2.2. <u>The project utilizes storm-water capture/rain harvesting</u>**

The elimination of storm-water in combined sewer systems may reduce the combined sewer overflow (CSO) volume, frequencies and wastewater transport/treatment costs. During a rain event, uncontaminated stored and filtered storm-water and rainwater can alleviate flooding, recharge groundwater, and improve water quality. Furthermore, rainwater diverted for reuse as irrigation water can save costs. Improving the quality of surface and ground water may reduce the cost of treatment for drinking water utilities.

The PER should explain in detail the significance of the anticipated storm-water capture/rain harvesting on the CSO volume, frequency and treatment cost.

**2.3. <u>The project reduces water loss, infiltration/inflow, and recycles stream volumes</u>**

Infiltration and inflow (also known as I/I) is defined as surface or ground water that enters a sanitary sewer system. The reduction of excess I/I in the sanitary sewer system can reduce the volume of wastewater that needs to be transported and treated and the possibility of sanitary sewer overflows and surcharges. In drinking water systems, addressing water losses can reduce lost revenues, inflated treatment costs, and unnecessary stress on the water source. A recycle stream is water generated by the plant that is returned to the treatment plant's primary treatment process. The reduction of recycle streams within wastewater and drinking water treatment plant can also reduce treated water volume and power consumption.

Credit is given based on the significance of the anticipated reductions in I/I (The SRF Loan Programs do not consider joint grouting a long-term solution to reducing I/I), water loss or recycle stream volume.

**2.4. <u>The treatment facility incorporates water conservation and side-stream reduction</u>**

Conserving water at the treatment plant reduces a utility's treatment costs and power consumption. Side-stream water use refers to water used in the treatment process; reducing or re-using it saves energy and treatment costs. Examples of water conservation and side-stream reduction components include:

- installation of water-efficient fixtures (waterless urinals, low-flow faucets and toilets, sensor-activated fixtures),
- non-potable water use for toilet flushing, cleaning equipment, and
- replacement of equipment or processes with more water-efficient ones:
    - tertiary filter upgrade to reduce backwashing,
    - centrifuge sludge for thickening and dewatering to replace a gravity belt thickener or belt filter press to use less wash water, and
    - sand drying beds or geotextile-bags to replace mechanical dewatering; no wash water required.

## 3. Site and Material Reuse Items

**3.1. <u>New construction occurs on a previously disturbed area</u>**

By utilizing a previously disturbed area for new construction, a utility can avoid the loss of agricultural land, undeveloped areas, and green space. The benefits of avoiding these areas allow a project to:

- preserve habitat for plants and wildlife,
- allow reuse of existing infrastructure,
- minimize erosion and sedimentation,

- maintain development density, and
- utilize otherwise idle property.

A brownfield site is a property that may be difficult to develop or reuse due to the presence or potential presence of pollution or contaminants.

**3.2. <u>The design takes into account the deconstruction of the new facilities and/or modification/retrofitting of the existing infrastructures for new use</u>**

Deconstruction is the selective dismantlement of facility components, specifically for reuse, recycling, and waste reduction. It differs from demolition where a site is cleared by the most expedient means; it focuses on giving the materials within a facility a new life once the facility as a whole can no longer continue. The design approach facilitates future deconstruction.

The benefits of deconstruction include:

- reduction in capital cost by reusing deconstructed materials,
- easier facility maintenance and adaptation to new use,
- less demand for virgin materials, and
- waste reduction.

Examples of deconstruction/retrofitting of facilities include utilizing:

- modular design,
- bolted rather than welded, adhesive or nailed joints,
- cavity wall construction for masonry buildings,
- restrained joints rather than concrete thrust blocks so that buried pipe fittings and valves can be salvaged,
- conversion of an existing structure for another use, and
- relocation and reuse of existing metal frame buildings.

**3.3. <u>Offsite reuse of either treated wastewater or a biosolids treatment process significantly reduces residuals disposal</u>**

The beneficial reuse of treated effluent reduces water consumption and the associated energy costs for treatment, saves space in landfills, and reduces the need for fertilizers. Examples of projects that could reuse the treated effluent include:

- irrigation systems,
- industrial cooling towers,
- agricultural land application of biosolids,
- marketing and distribution of Class A biosolids to general public,
- use of Class A biosolids for landfill cover material or land reclamation, and
- use of biosolids in a composting facility.

**3.4. <u>The project beneficially utilizes recycled materials</u>**

Construction materials with either pre-consumer or post-consumer recycled content are available for use in wastewater and drinking water projects. The benefits of using recycled materials mean less demand for virgin materials, waste reduction, and reduced environmental impacts from extraction of materials.

Examples of projects using recycled materials include:

- glass aggregate in asphalt,
- recycled asphalt in new paving,
- fly ash in concrete, and
- crushed debris used as engineered fill.

**3.5. The specifications include an incentive clause for construction waste reduction, cut/fill earth work balance**

Construction projects generate large volumes of waste material from demolition or site preparation, most of which are disposed of at landfills. Construction projects that recycle or reuse construction material and earth work that reuses excavated materials will divert waste from a landfill. A utility will reduce its disposal costs when less material is sent to the landfill. Examples of construction waste material that may be recycled or reused include:

- asphalt,
- concrete,
- surplus paint,
- scrap lumber,
- scrap metals, and
- excavated material.

**3.6. Low impact construction technology is used to minimize impacts to the existing surface**

The installation or rehabilitation of wastewater collection/water distribution systems by open-cut construction can cause significant disturbance. Utilities that use low-impact technologies to complete pipe installation reduce environmental impacts, soil erosion, traffic obstructions, and, in some cases, construction costs. Furthermore, fewer traffic obstructions may increase public safety. Examples of low-impact pipe installation /rehabilitation technologies include:

- pipe bursting,
- cured in place pipe (CIPP),
- slip-lining,
- horizontal directional drilling,
- bore and jack,
- robotic lateral methods,
- fold and form pipe, and
- spiral wound.

## 4. Life-cycle Cost and Cost Effectiveness Analysis

To properly evaluate a project's long-term costs a life-cycle cost comparison of feasible alternatives is strongly recommended. Total life-cycle cost for each alternative includes estimated costs associated with operation and maintenance (O&M) costs during the service life (20 years) discounted to its present value and added to the capital cost estimate, together known as Net Present Value (NPV)*. The resulting NPV allows participants to assess the true cost of construction projects. The participant may realize significant costs savings by choosing an alternative that requires fewer chemicals and less energy and manpower to operate.

In order to receive full credit for this category, a comparison of the feasible alternatives for the project including the proposed SI/GI components, NPV analysis, technical and operational reliability and environmental impacts is required. Consideration must be given for selection of alternatives acceptable to the public affected by the project.

* *SRF Loan Programs will provide the participant/applicant an estimated interest rate to be used in the lifecycle analysis.*

# DEFENITIONS

**Alternative Energy:** Energy sources that do not deplete natural resources or harm the environment (e.g., wind, solar, etc.)

**Brownfield:** A brownfield is generally a property where redevelopment is complicated due to actual or potential environmental contamination.

**Carbon Footprint:** The measurement of human impact on the environment in terms of the amount of greenhouse gases produced, measured in units of carbon dioxide. Also, see Primary Carbon Footprint, and Secondary Carbon Footprint.

**Deconstruction:** The selective dismantlement of facility components, specifically for reuse, recycling & waste reduction. In addition, design focuses on giving the materials within a facility a new life once the facility as a whole can no longer be used.

**Diesel Emission Traps:** A particulate trap or filter used as an after treatment device to filter or trap diesel particulate matter from engine exhaust until the trap becomes loaded to the point that a regeneration cycle is implemented to burn off the trapped particulate matter.

**Energy Audit:** An inspection, survey and analysis of energy use in a building, process or system with the objective of understanding the energy dynamics of the system under study. Typically an energy audit is conducted to seek opportunities to reduce the amount of energy input into the system without negatively affecting the output. When the object of study is an occupied building then reducing energy consumption while maintaining or improving human comfort, health and safety are of primary concern. Beyond simply identifying the sources of energy use, an energy audit seeks to prioritize the recommendations according to the greatest to least cost effective opportunities for energy savings.

**Green Roof:** A veneer of vegetation that is grown on an otherwise conventional flat or pitched roof endowing the roof with hydrologic characteristics that allow for storm-water capture rather than runoff. This form of storm-water Best Management Practice (BMP) allows evaporation and evapotranspiration to occur rather than a typical impervious roof surface causing storm-water runoff.

**Hardscape:** Outdoor part of a property which is inanimate such as the roads, parking lots and sidewalks as opposed to landscaped (trees, grass, and shrubs which use water) living part.

**Heat Island Effect:** Occurs when air and surface temperatures over pavement, building or other infrastructure are higher than the nearby vegetated areas.

**Porous Pavement:** Pavement or concrete with large pore spaces which allows water to drain and be temporarily held in the voids in the stone bed, and then, slowly released into the underlying uncompacted soil. A layer of geotextile is wrapped around the stone bed layer to prevent fines from clogging pore space and preventing storm-water from draining through the pavement/concrete. Porous pavement is well suited for parking lots, walking paths, sidewalks, playgrounds, plazas, tennis courts and other similar areas.

**Primary Carbon Footprint:** The primary carbon footprint is the sum of direct emissions of greenhouse gases from the burning of fossil fuels for energy consumption and transportation. For example, more fuel-efficient cars have a smaller primary carbon footprint, as do energy-efficient light bulbs.

**Rain Gardens:** Excavated shallow surface depressions planted with specially selected native vegetation to treat and capture storm-water runoff. Rain gardens typically consist of a rock layer under drain wrapped in geotextile (to prevent clogging the pore space) with a highly porous soil placed at the surface for planting native vegetation. Rain gardens are designed to reduce runoff volume, filter pollutants, recharge groundwater via infiltration, reduce storm-water temperature impacts, enhance evapotranspiration, enhance aesthetics and provide habitat.

**Renewable Energy:** Energy generated from natural resources such as sunlight, wind, rain and geothermal heat which are renewable (naturally replenished).

**Secondary Carbon Footprint:** The secondary footprint measures $CO_2$ emissions from the whole lifecycle of products or materials we use, from manufacturing and distributing. Buying locally reduces emissions used for transportation.

**Retention/Detention Basins:** These are generally impoundments placed down slope of the earth disturbances to capture storm-water and allow retention, infiltration evaporation and evapotranpiration of the storm-water. They are the most typical form of storm-water runoff control in areas of development.

**Supervisory Control And Data Acquisition (SCADA):** A system that monitors and controls field devices using remote terminal units at strategically placed sites.

**Sustainability:** Practices that meet the current needs while ensuring the continued viability of a product or practice well into the future.

**Variable Frequency Drive (VFD):** VFD is a system typically utilized when the design conditions demand adjustment of rotational speed of an electric motor by controlling the frequency of the electrical power supplied to the motor.

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Sources: Massachusetts Department of Environmental Protection, Pennsylvania Department of Environmental Protection, EPA Handbook of Procedures, Brundtland Commission, the Encyclopedia of Earth, American Council of Engineering Companies, Indiana Chapter (ACEC).

Revised 11/12/08